

UIC Activities Promoting Agency Priorities

CLIMATE CHANGE

- **Class V Aquifer Storage and Recovery (ASR) wells:** Addresses complex regulatory and technical issues to support climate change mitigation goals connected with safe water sustainability. Examples:
 - Region 4 and HQ worked closely with Florida to address issues associated with ASR and arsenic mobilization at public water systems and are continuing work to address the issue at other types of facilities.
 - Region 8, in conjunction with the PWS program, is conducting a midcourse evaluation of rule-authorized ASR projects in CO to determine if any of these projects need to be called in for permits.
 - In Region 10, Oregon in particular, has a significant number of ASR wells. The Region is reviewing Idaho's UIC guidance and current practice to determine whether their definition of ASR regulates agriculture drainage wells that rely on injection for fluid disposal/recharge in the aquifer.
- **Other Complex Class V UIC Wells:** There is increasing use of complex types of UIC wells in relation to climate change adaptation and mitigation. The specific work load associated with Class V well depends on the type of well. These activities require UIC program support through additional permitting, siting, technical support, inspections, enforcement, public meetings and coordination with other programs.
 - *Renewable Energy:* In fall 2014, Region I is hosting a workshop of state and industry representatives to discuss the latest in geothermal well technologies, state regulatory changes related to geothermal wells, and potential impacts on drinking water sources.
 - *Reduce Emissions:* In 2013, Region 9 re-issued a Class V Experimental Permit to the City of Los Angeles for biosolid slurry fracture injection. The permit requires extensive monitoring of fracturing, plume movement, and subsurface gas (CO₂ and methane) generation.
- **Geologic Sequestration:** Implementation of the Class VI Geologic Sequestration Rule (finalized in 2010) and associated OAR rules through permits, guidance and state primacy issuance is essential to the success of the Agency-wide effort to support climate change mitigation through greenhouse gas emissions reductions:
 - *Class VI permitting:* Region 5 and HQ have spent considerable effort in development of multiple Class VI permits. As the first permits of their kind, it is critical that they be implemented in a way that is both protective and publicly supported. This has involved working extensively with stakeholders including operators and the public. With HQ

support, Regions 7 and 8 also have discussions ongoing with Class VI permit applicants and prospective applicants. (Details attached.)

- *Guidance:* The HQ UIC Program has developed a series of technical guidance documents to support effective Class VI implementation including topics such as project siting, financial responsibility and injection well construction. Seven documents have been finalized and six remain in progress. All have included technical review and public comment.
- *Primacy:* Region 8 and HQ are working with the state of North Dakota to approve primary enforcement responsibility for Class VI wells by the state. This has involved primacy application review and negotiation to create new protective regulations.
- *Class II Enhanced Recovery Permits:* When oil and gas producers use CO₂ for enhanced recovery purposes, in some cases CO₂ stays behind, trapped in subsurface formations. Region 3 has recently completed a Class II-R permit in Virginia using CO₂ for the enhanced recovery of gas from coal seams. If the owner or operator opted to report under Clean Air Act Requirements at Subpart RR of the Greenhouse Gas (GHG) Reporting Program, the Agency would recognize the well as conducting Geologic Sequestration and contributing to CO₂ emissions reductions. Other Class II-R wells throughout the United States have the same potential provided owners or operators comply with (optional) Clean Air Act reporting requirements at Subpart RR.

ENERGY

- **Public Concern on Class II Disposal Permits:** The need to address political and public concern inspired by hydraulic fracturing has greatly increased the level of effort in issuing Class II permits that have received little interest in the past. Specific examples:
 - In Region 3, every Class II Disposal permit of the last nine developed has resulted in public appeal and EAB remand, requiring considerable effort to respond to. The development of the administrative record has become key.
 - Region 4 recently received strong opposition to a proposed Class II-D permit issuance in Florida which has been very resource intensive.
 - Region 5 is finding it difficult to temper expectations relative to the capacity of the UIC program to resolve public concerns about hydraulic fracturing... *Details?*
- **Streamlining Area Permits:** Region 8 implemented one of the nation's largest EPA-issued Class II area permits in history, covering 472 existing wells within a 95-square mile area in Utah. Through a systematic review of more than 150 existing permits, the Region established a more stringent and uniform set of requirements to improve consistency and Agency

oversight thereby significantly enhancing ground water protection. In doing so, the Region also designed and implemented an innovative streamlined process that can be used as a national model for authorizing future conversion of production wells to injection wells with increased efficiency and stronger environmental protection

- **Induced Seismicity:** Earthquakes in areas of new and increased unconventional oil and gas production has raised concerns about the potential for induced seismicity resulting from Class II injection.
 - The National Technical Workgroup (NTW) is developing a report with practical tools for UIC regulators to address injection-induced seismicity.
 - Region 3 has developed a seismicity framework that is utilized during permit application review to support the issuance of Class II permits. The framework is based in part on the draft NTW report and was a collaboration between the UIC program and Regional counsel. Although taking considerable time to develop, the framework will smooth future response to public appeals on permits.
 - Region 5 has provided support to the State of Ohio in responding to earthquakes at Class II wells and updating state regulations to address seismicity. (*Correct?*)
 - Region 6 has provided support to USGS and the State of Oklahoma in understanding earthquake activity in the area and writing protective permits. (*Correct?*)
- **Enforcement Actions:**
 - Region 4 undertook a resource intense termination of a Class II-R Permit for cause in Kentucky in response to an oil seep in Crocus Creep within the area of review of the well. EPA Region 4's Emergency Response and Removal Branch OSC responded to a complaint and the UIC program identified the cause and took enforcement action. This is the first and only UIC permit proposed for termination for cause by Region 4.
- **Coordinating with other agency programs:**
 - Increased involvement in energy sector activities including oil and gas production and in-situ uranium mining has led to increased requests for aquifer exemptions that involve higher quality and/or relatively shallow aquifers that occur in complex hydrogeologic settings. Consequently, additional technical expertise may be needed in order to facilitate a more rigorous review and legally defensible decision. Region 8 has developed criteria for determining when additional internal Agency consultation is needed, a process for reaching out to experts within other offices and steps to take when technical consensus is not achievable.
- **Complex Class V UIC Wells:** There has also been increasing use of complex types of UIC wells in relation to energy efforts. Example:

- Region 8 is drafting a deep Class V area permit for Dewey Burdock uranium ISR wastewater disposal in South Dakota.
- **Hydraulic Fracturing Study:**
 - Region 6 has taken over contamination evaluation in Wise County, Texas.
 - HQ assistance on development of the study has included reviewing the draft versions of the Well Injection Chapter and supporting projects in conjunction with the Well Injection Chapter and Wastewater Treatment and Disposal Chapter.
 - Key staff from HQ and multiple Regions are on extended details of two years or more to the ORD study.

GREEN INFRASTRUCTURE and STORMWATER

Green infrastructure seeks to sustainably manage stormwater by reducing runoff via infiltration that more closely mimics natural hydrologic conditions. Successful Implementation of green infrastructure depends upon comprehensive strategies that collectively protect surface and ground water as a single resource. In some cases, green infrastructure devices meet the definition of Class V UIC wells.

- Region 1 is working with stormwater staff promoting infiltration through low impact development stormwater management practices to make them aware of the challenges and UIC regulations associated with subsurface discharges. Region I UIC and source water protection staff are included in development of the region's Integrated Stormwater Strategy. Bi-monthly meetings are held to discuss this strategy. In January 2014, Region I co-hosted a meeting of state UIC and stormwater staff to discuss how each program regulates discharges and green infrastructure.
- The Region 2 UIC program partnered with CWA inspectors to monitor compliance with the industrial stormwater permitting requirements. It had been found that facilities are utilizing stormwater dry wells as means to comply with industrial stormwater permits and UIC inventory requirements are not being met. The Region expanded to include the MS4 areas because CWA inspector observed UIC violations during MS4 audits.
- Region 2 targets Class V inspections based on the universe of facilities subject to the Industrial Stormwater MSGP and Municipal Separate Storm Sewer System (MS4) MSGP communities. This FY this effort continues in NYS.
- Region 3 has spent a considerable amount of time working with companies as well as coordinating with other Region 3 offices on supporting safe implication of stormwater projects. Examples:

- *Nitrate:* About 90 water systems were allowed by the state NPDES program to re-inject drinking water treatment residuals back into their on-lot septic systems. They have since stopped this and the Region now is working to eliminate the option with existing systems to prevent risk of nitrate contamination. Actions include gathering analytical data on the treatment backwash and potentially the discharge to the septic systems to determine potential endangerment.
- *Subsidence:* In Palmyra, PA about 60 storm water disposal wells were put in before the program, but inventoried. We had to take an enforcement action when the wells were causing subsidence of a home and road due to intersecting a sink hole that then grew over time and caused structural damage. The Town made repairs and closed the well.
- *Subsidence:* Did a review of a stormwater permit that indicated that the proposed apartment structure with parking lot drainage was scheduled to be constructed over the sink hole receiving the storm water run-off. We asked them to do more structural studies of the sink hole and geology and they ended up reconstructing the disposal area and significantly shifting the orientation of the apartment complex to avoid any structural complications.

Attachment: Class VI Geologic Sequestration Rule Details

Permits

- Region 5: Two projects (6 permits)
 - Archer Daniels Midland Project: Two wells/permits
 - Stage: Post-draft permit notice
 - CO₂ source: An ethanol plant converting biomass into ethanol
 - Total proposed injection volume: 6.5 million tons of CO₂ (via two wells)
 - Proposed total project duration: 18 years
 - FutureGen 2.0 Project: Four wells/permits
 - Stage: Post-draft permit notice
 - CO₂ source: Retrofit of the existing (retired), Meredosia coal-fired power plant with an oxy-combustion technology to allow CO₂ capture
 - Total proposed injection volume: 22 million tons of CO₂ (via four wells)
 - Proposed total project duration: 70 years
- Region 7: One well/permit
 - Berexco/Kansas Geological Survey: One well/permit
 - Stage: Permit application review
 - CO₂ source: TBD
 - Total proposed injection volume: 40,000 tons
 - Proposed total project duration: TBD
- Region 8: One project in development in Montana
 - Big Sky Partnership: One to two wells/permits
 - Stage: Permit application not yet received/anticipated in late 2014
 - CO₂ source: Kevin Dome
 - Total proposed injection volume: 1 million tons
 - Proposed total project duration: TBD

Technical Guidance

Documents finalized in 2011/2012/2013/2014:

- Financial Responsibility: July 2011
- Well Construction: August 2012
- Project Plan Development: September 2012
- Testing and Monitoring: April 2013
- Site Characterization: May 2013
- Area of Review and Corrective Action: May 2013
- Primacy Manual: April 2014